Small Business Innovation Research/Small Business Tech Transfer

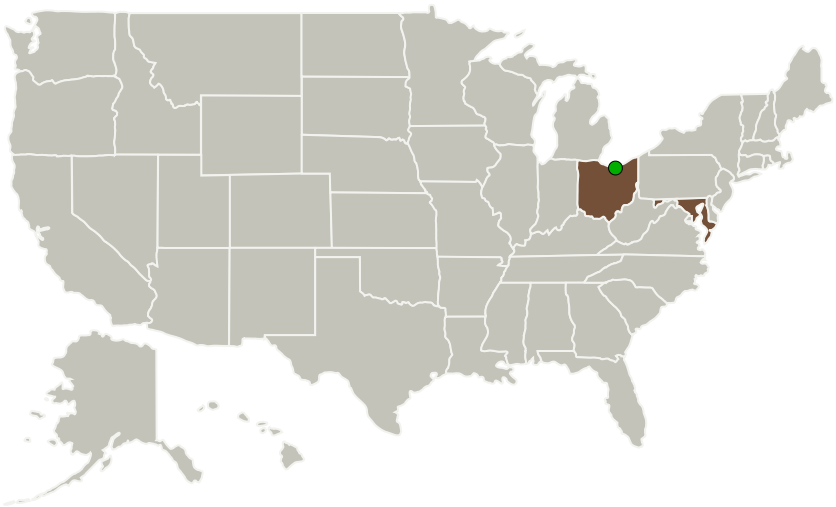
Security-Enhanced Autonomous Network Management for Space Networking, Phase II

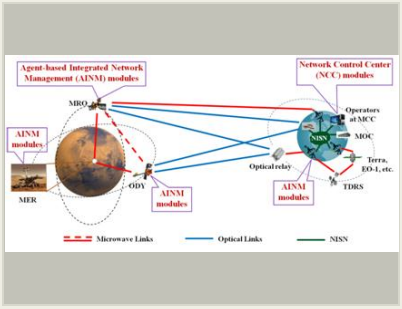
Completed Technology Project (2012 - 2015)

Project Introduction

NASA's Space Communications and Navigation (SCaN) program is integrating its three current agency networks: Space Network (SN), Deep Space Network (DSN), and Near Earth Network (NEN). This effort raises several issues for the network management in the future integrated space networks. First, an integrated network management function, which uses common standards and implementations, is needed to serve as the interface for all SCaN network customers. Second, satellite operations currently use a highly manual approach. The research and development of autonomous operations has been conducted recently but is still at early stage. Third, due to different characteristics of space networks, security management mechanisms and other network management functions that are widely adopted in the traditional networks are not fully suitable to space networks. In addition, several issues related to Bundle Protocol exist and need to be further investigated to enhance the performance of bundle delivery in delay tolerant networks. To address these issues, we propose an innovative Security-Enhanced Autonomous Network Management (SEANM) scheme for reliable communication in space networking, which allows the system to adaptively reconfigure its network elements based upon awareness of network conditions, policies, and mission requirements.

Primary U.S. Work Locations and Key Partners





Security-Enhanced Autonomous Network Management for Space Networking Project Image

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

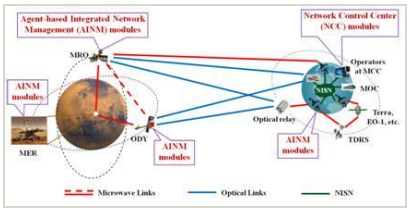
April 2012: Project Start

May 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137389)*

Images



Project Image
Security-Enhanced Autonomous Network Management for Space Networking Project Image *(https://techport.nasa.gov/image/136363)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

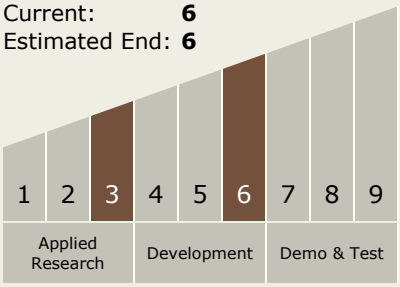
Carlos Torrez

Principal Investigator:

Hui Zeng

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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Completed Technology Project (2012 - 2015)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.3 Internetworking
    - TX05.3.3 Information Assurance

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System